

## CHAPTER CONTENTS

### OVERVIEW

### DESIGN DEVELOPMENT

### DESIGN EXECUTION

### STANDARDS

### INTERIOR FINISHES

### FURNITURE

### FUNCTIONAL AREAS

### FINISHES FOR FUNCTIONAL GROUPS

### BUILDING CODES

### FIRE TESTING

## OVERVIEW

The Interior Design Principles provide and describe interior design policies and practices that support Air Force Civil Engineering. The audience for this chapter includes: base interior designers, facility managers, A/E contractors, interior design contractors, and others involved with Air Force interior projects. In this era of right sizing and limited funding, smart selections of building materials and furnishings are necessary. Well designed interiors are major components in providing quality facilities, that, in turn, attract and retain quality personnel to sustain the Air Force.

### *Philosophy*

Quality interior design reflects “understated excellence” and assures that facilities are attractive, environmentally safe, operationally efficient and maintainable. Interior designers must strive for sound, economical, functional, and aesthetic design achievements. Well designed facilities satisfy users’ needs, install pride in ownership, and promote productivity in the workplace.

### *Function*

Functional interior designs ensure that each aspect of an interior environment performs efficiently for its users. A good working relationship between users and designers will help accomplish this goal. Each facility type presents unique functional requirements that will ultimately affect the selection of finish materials and furnishings. It is important that designers investigate all aspects of spatial requirements via the users.

### *Cost Effectiveness*

All interior selections must reflect the “best buy” for the Air Force in terms of aesthetic value, maintenance characteristics, and life-cycle costs. Inexpensive, short-term solutions do not necessarily produce cost savings.

### *Life Cycle Cost and Appeal*

When making selections, designers must consider product performance and longevity of appeal, as well as initial costs. As the appeal of finish materials degrade, users want to replace them; therefore, products which keep their appearance and shape longer are better choices even when initial costs are higher.

### *Durability*

Durable designs and finishes pass the “test of time.” Designers must be concerned with material durability and wearability while considering budget restrictions. Selections of quality materials and products must also be appropriate to the function and level of use of each facility.



<i>Maintainability</i>	The use of easily maintained finishes is critical. While certain finishes may provide excellent durability, designers must give serious consideration to maintaining the appeal of materials. It is critical that designers be familiar with finishes that wear well and require low maintenance.
<i>Compatibility</i>	Each installation has its own compatibility plans that reflect regional, environmental, and architectural considerations. Designers should be familiar with installation plans to achieve unified scales, traditions, and excellence in facilities.
<i>Design</i>	Facilities must meet as many “human” needs at as many levels as possible. Now, more than ever, working and living environments are within the control of those who design and build them. Well designed interiors can contribute to higher achievements in the work place, and enhance pleasure and relaxation in hospitality and recreational facilities.
<i>Creativity</i>	Budget constraints place increased importance on design creativity. Proper planning and research of innovative design features will aid designers in providing quality facility interiors within restricted budgets.
<i>Flexibility</i>	Flexible designs are essential to meet dynamic requirements. While the primary function of each facility must be first priority, designers must keep in mind which functions evolve, and which facilities may require future modifications. Rapid technological advancements often demand upgraded equipment, power and communication requirements.
<i>Timelessness</i>	The elements of pure design, including structural expression, suitability of materials, harmonious visual and tactile features, and classic furnishings, will always remain the foundation of good design. Designers should avoid trendy or dated finishes and design features. Interior spaces should be creative but not extreme, reflect quality but not opulence, and be capable of being updated without requiring significant changes to materials, and functions.
<i>Terminology</i>	<p>The following terms are universal in all fields of the arts and architecture; however, for our purposes, these definitions pertain to interior design.</p> <ul style="list-style-type: none"> <li>• <i>Repetition</i> – the use of the same visual effect several times in a space. Repetition may produce a sense of harmonious relationships, obviously planned patterns, or rhythmic movements.</li> <li>• <i>Rhythm</i> – a sense of movement created by regulated patterns.</li> <li>• <i>Variety</i> – the use of opposing, contrasting, changing, elaborating, or diversifying elements in a composition to add individualism and interest.</li> </ul>



- *Balance* – a feeling of equilibrium in weight. A symmetrical balance is easily achieved by dividing a space in two and identically designing each half. An asymmetrical balance is more difficult to achieve when placing items in a space to create harmony while fulfilling functional requirements.
- *Harmony* – the repetition of visual elements with similar characteristics assist in creating comfort in a space.
- *Proportion* – the relationship of object sizes in a space. When proportions are out of scale, spaces can feel awkward. History shows that mathematical proportions are most pleasing when they are based on human and natural elements.
- *Scale* – the relationship of object sizes to the size of the human figure enhances comfort.

#### *Design Communication*

#### DESIGN DEVELOPMENT

The design development process begins when designers understand the functional and aesthetic requirements of each space. Designs must be effectively communicated to all parties involved in the design process. Users should be confident that their spatial and functional needs will be met. Design documentation is necessary to illustrate a comprehensive theme with interior detailing. The designer should provide written explanations or a “design narrative” to inform users of the specific selections chosen and why. Rendered plans, elevations, sections, and perspectives should clearly illustrate each carefully planned concept. Material finishes and furniture boards should display well-coordinated schemes. Users’ satisfaction is as important as the longevity of interior designs. Educate users to appreciate the long-term qualities of good designs and give them the opportunity for direct input throughout the submittal process and during each stage of design development. The final design should not present users with surprises or issues that were not previously identified or addressed.

#### *Required Documents*

Specific guidance, presentation format, and detailed information on the development of the Structural Interior Design (SID) and Comprehensive Interior Design (CID) packages can be found in the *Air Force Center for Environmental Excellence Interior Design Presentation Format* handbook. This handbook outlines, in detail, the sections and drawings required during the submittal process with presentation formats. It includes a CID cost estimating guide as well as A-E contract information and an index of reference standards to be used by interior designers during design development.

#### *Implementation*

#### DESIGN EXECUTION

Once final approval of the design concept and finishes have been accomplished, a completed design package must be submitted. The contract documents must clearly convey the design intent and provide the information

necessary to implement and construct the design. As mentioned above, the *Air Force Center for Environmental Excellence Interior Design Presentation Format* provides information on required documents.

*Scope of Work*

Brief but thorough descriptions of work to be performed by the contractor should be prepared by each design team. The contracting office will utilize this information to synopsise the project for the bid advertisement.

*Drawings*

Drawings are reviewed by users for adequacy of space and function as well as used by contractors for bidding and construction information. Drawings include demolition plans, floor plans, reflected ceiling plans, design details, elevations, mechanical plans, electrical plans, plumbing plans, finish material placement, and other information as needed.

*Specifications*

The product specifications are critical for achieving a successful design. They must be very detailed and should be closely reviewed to ensure the Air Force receives quality products, materials, and craftsmanship. DOD policy is to utilize commercial specifications in lieu of federal and military specifications when they clearly meet the proper requirements.

*Philosophy*

#### STANDARDS

The diverse missions in the Air Force require unique facilities to support several programs. This presents a challenge for designers regarding quality standards, use of materials, functional requirements and budget limitations. Standardizing interior building finishes throughout facilities establishes a benchmark for desired results. Many facilities are multifunctional and accommodate many different organizations. This can make one single set of standards difficult to apply. Following the installation, standards help to ensure a facility keeps its architectural integrity and interior scheme as functions change.

The following section defines standards for building finish materials according to finish application and criteria for individual building types and functional areas. These standards should be used as general guidelines for choosing the most advantageous products available. Due to varying locations, circumstances and requirements, alternate material choices may be required. Designers and users must research these early in the project.

#### INTERIOR FINISHES

Choosing finishes and colors can be “fun”; however, one must make selections that not only meet appropriate standards for functionality and durability, but also conform with Uniform Building Codes – Fire and Life Safety, and the Americans with Disabilities Act (ADA). (See *Building Codes* and *Fire Testing*, page 38.)

Note: All finishes are to be installed according to manufacturers’ instructions and properly maintained as per manufacturers’ warranty specifications.



### *Floor Finishes*

Floor finishes are major design elements in interior spaces. These materials chosen are to be appropriate for the function of the space as well as aesthetically appropriate. Acoustical properties of floor finishes have great impact on noise levels, and the colors of the finishes impact the lightness or darkness in spaces. Extremely light colors, especially white, should be avoided in high traffic areas due to soiling and possible glare. Floor patterns or changes in floor finishes may be used to create circulation paths or separation between spaces. Of all finishes, floors will get the most wear and are usually the most expensive finish material.

There are three basic categories of floor coverings:

- Hard surfaces – concrete, wood, stone, ceramic, and terrazzo
- Resilient surfaces – vinyl composition tile, sheet vinyl, rubber, and linoleum
- Soft surfaces – carpet and area rugs

#### *Concrete*

Concrete is the basic structural material of floors in most new construction and, when scored, painted, stained, or glazed, can provide an aesthetically pleasing finish.

#### *Wood*

Wood flooring is typically an expensive upgraded finish that is applied in special areas. Hardwoods, such as oak and maple are much more durable than softwoods. Softwoods are susceptible to indentions over time from moderate to heavy traffic. The following applies to wood finishes:

- Usually installed in large planks, smaller strips, or parquet slats, and can be simple or very intricate in design.
- Usually 3/4" thick, but thinner products are produced and may not withstand sanding or refinishing; therefore, its life is limited.
- Finished in the field with oil based polyurethanes, water based polyurethanes, or by acid curing. Acid curing and oil based polyurethanes have high Volatile Organic Compound (VOC) ratings and must be installed with caution. Water-based polyurethanes have lower VOC ratings but are thinner and will require several applications. They are also more expensive due to the labor intensive process.

#### *Stone*

Stone floors include slate, granite, marble, limestone, and travertine among others. Stone is available in a variety of colors and finished in one of three ways:

- Polished finish – requires high maintenance, has poor slip resistance, and should not be used in heavy traffic areas, especially adjacent to building entrances.
- Honed finish – has a dull, smooth finish with good slip resistance.
- Thermal finish – has a great deal of texture and is very slip resistant.



*West Missile Range Operational  
Control Center*  
Vandenberg Air Force Base, California

All stone may be used in interior or exterior applications; however, some stone, such as slate, requires applied sealants when used indoors. Granites are very durable surfaces that can be used in most applications. Marbles range from hard to soft and are classified as such. Marbles usually require the most maintenance.

#### *Ceramic Floor Tile*

Ceramic tile is made up of either clay or porcelain. The types of ceramic tiles available are mosaic, quarry, and paver. There are four absorption categories: nonvitreous, semivitreous, vitreous and impervious, with impervious being the least absorptive. The lower the absorption level, the greater resistance there is to staining. The following applies to using ceramic tile:

- In heavy traffic areas, such as vestibules and shopping mall corridors, a quarry, paver, or heavy duty porcelain tile is recommended. Larger tiles require fewer grout seams per square foot; therefore, they are easier to maintain.
- A mottled or shaded tile camouflages stains and is easier to maintain than an overall flat color.
- Mosaics are small tiles that are typically less than 1" wide and can be used for intricate designs and patterns. Webbing may be applied to the back of the tile for easy installation.
- Quarry tiles are thick and durable. These are usually installed in heavy traffic areas such as commercial kitchens.
- Pavers are larger tiles that are typically found with textured surfaces. These tiles may be installed with a cement-based mortar in a thick set or thin set method; the thin set method is most preferred. The thick set method works well where slopes and drains are desired.
- Consider the use of Epoxy grouts to avoid discoloration. If sand grouts are the only possibility due to budget restraints, use dark colors.

#### *Terrazzo*

Terrazzo is a flooring material of various sizes of marble chips in cement mortar. Metal divider strips are used as expansion joints. Terrazzo mixtures are typically installed two inches thick, but can be installed in thinner settings.

#### *Vinyl Composition Tile (VCT)*

Vinyl composition tile is an economical floor covering that is easy to install, clean, and repair. The following applies to VCT:

- 12" x 12" (305 mm x 305 mm) tile, 1/8" (3.2 mm) gauge, pattern to go full depth of tile.
- "No wax" finishes should be limited to residential or light traffic wear.

#### *Sheet Vinyl*

- Vinyl sheet flooring is produced in large sheets to allow for few joints.
- Minimum of .085" (2.16 mm) gauge, pattern to go full depth of wear level (.50" or 1.27 mm).
- "No wax" finishes should be limited to residential or light traffic wear.
- Give special care to seams.

### *Linoleum*

Linoleum is a natural product that is made up of linseed oil, cork, and wood flour. These materials combined provide a durable finish with superior thermal and acoustic properties. Linoleum can be purchased in sheets or large tiles in a variety of colors, and unlimited patterns can be created.

### *Carpet*

Carpet is a popular floor finish that is manufactured in broadloom rolls or carpet tiles. There are two processes for constructing carpet – tufting and weaving. The tufted process is more common involving yarns tufted into a backing then covering the backing with latex to secure the yarns. Woven carpet is a strong, heavy carpet in which the pile and backing yarns are woven together.

Carpet, of good quality, is popular because of its durability, soft touch and appearance, and acoustic properties. It aids in sound reduction more than any other floor finish.

The following apply when selecting and installing carpet:

- See ETL 94-3 Air Force Carpet Standards for all facilities.
- See Air Force Family Housing Carpet Standards dated Sept 94.
- Provide reducers, metal strips, or other edging in areas where carpet abuts other floor surfaces.
- Patterned carpets help to “mask” soiling in traffic areas. Choose patterned carpets with distinguishable designs of two or more different colors. Tone on tone color combinations do not hide soil. Solid colored carpets should only be placed in commanders’ suites, chapels, DV suites and family housing units.

### *Access Flooring*

Access flooring, also known as raised flooring, involves elevated, lift-out floor panels supported by an understructure. It is installed to allow cabling, HVAC or electrical wires to run under the floor for easy access. Access flooring is typically installed between 6”-12” high. Cost of access floor is often offset by eliminating extensive installation of overhead electrical and cable systems. Carpet tiles should be used with access flooring instead of rolled goods.

### *Wall Finishes*

Typical wall systems include wood or metal studs, wood post and beam framing, steel and reinforced concrete framing, and masonry. Interior walls and partitions may be load bearing or non-load bearing. Wall surfaces must be able to accept desired finishes.

Gypsum board is installed as the wall substrate in most commercial interior projects. Gypsum board is also referred to as wallboard, sheet rock and drywall. Typically a Type “X” gypsum board is used when a fire rating is required. Other types of gypsum board include: green board or moisture resistant



gypsum board; foil backed board used as a vapor barrier; blue board used as a substrate for veneer plaster, and pre-finished gypsum board that has a decorative vinyl or fabric finish.

#### *Vinyl Wall Coverings*

Fabric-backed and paper-backed vinyl wall coverings are popular for their low maintenance. Fabric-backed wall coverings are the most durable. Roll goods are generally 27/28" wide and approximately 5 1/3 lineal yards. Yard goods are 53/54" wide and sold by the lineal yard. Vinyl wall coverings come in three types, Type I, II, and III. Type I is less durable, and therefore, used in lower traffic areas. Type II is used in heavier traffic areas such as corridors and public spaces. Type III is the least used due to its high cost and limited applications, but is excellent for walls that take extreme abuse. The following applies to vinyl wall coverings:

- When installing wall coverings over CMU, first fill grooves, then prep each surface with a skim-coat of plaster, or as specified by the manufacturer.
- Vinyl wall coverings and paneling used in corridors, stairs, fire exits, or sleeping rooms, must have "Class A" fire ratings. See NFPA 101, 6-5.3.5.
- Avoid the use of vinyl wall coverings on the inside of exterior walls in humid climates. The low permeability of most vinyls will interfere with vapor transmission and will result in rapid deterioration of the wallboard.
- Wherever possible, wall coverings should be ended in an inside corner where walls meet. If this is not feasible, always provide edging to protect exposed edges at outside corners, matching wall surfaces when possible.

#### *Fabric and Acoustical Wall Coverings*

Fabric wall coverings can be beautiful wall finishes that are typically used in upscale spaces with low traffic. Conference rooms and areas that require speech privacy are good candidates for fabric wall coverings. The follow applies to fabric wall coverings:

- Fabric wall coverings usually require a paper or latex backing for stability and protection from glues seeping through the fabric.
- Install acoustical wall coverings in areas where acoustical properties are important. Acoustical wall coverings are generally 36" to 40" or 53/54" wide and sold by the lineal yard.
- Upholstered wall coverings are a field installed wall finish in which the fabric covers a frame that attaches to the wall. The selected fabric should be compatible as a wall treatment. Designers should typically avoid nylon, rayon and viscose in these applications due to sagging.
- Textile wall coverings are only permitted if they are Class A and if the building is fully sprinklered.
- All textile wall coverings must be tested and pass the NFPA Test 265.

#### *Wallpaper*

Wallpaper is typically used for residential projects due to its limited resistance to wear and maintenance. See NFPA 101, 6-5.

### *Paint*

Paint is an inexpensive finish that is easily applied and can be used to create various textures. Paints come in two options: latex (water based) and oil (solvent based).

Paint is produced in four basic sheens:

- Flat or matte finish – produces the least glare but is also the least durable. This finish is applied in low traffic areas.
- Satin or eggshell finish – has a light sheen and is more durable than the flat finish.
- Semigloss finish – has a good sheen and is yet even more durable. Apply to areas that required frequent cleaning, such as kitchens, bathrooms, door trims and moldings.
- Gloss finish – has a very shiny appearance and is very durable. It is difficult to apply a new finish over gloss.

Avoid stark white as a color choice for paint. Off-whites and “toned-down” or subdued hues aid in hiding soil.

### *Ceramic Wall Tile*

There are several options of glazed and unglazed ceramic tiles for surfacing walls. Wall tiles have low impact resistance and are typically glazed. Install tiles from floors to ceilings on wet walls, such as showers, and at least wainscot height behind lavatories and toilets is preferred.



*Iditarod Dining Facility*  
Elmendorf Air Force Base, Alaska

### *Wood Paneling*

Wood paneling is an expensive wall treatment, and therefore is usually applied to upscale spaces. Wood veneer wall coverings give luxurious looks without the expense of wood paneling. The veneer can be installed finished or unfinished, and since veneers are so thin, it is imperative that substrates be very smooth. Exposed edges of wood paneling at chair rails (30” to 32” on center) or at wainscot (42” to 48”) heights should be finished with wood trim moldings stained to match paneling. It is not recommended using imitation wood finishes, paper, or vinyl top applications to simulate wood. Wood paneling must have the appropriate wall and ceiling fire classifications to meet NFPA 101 requirements for the areas in which they are used.

### *Ceilings*

There are several materials that may be used for ceilings, such as hardwood, reinforced concrete, metal, plaster, drywall, and acoustical tile.

### *Acoustical Tiles*

Acoustical ceiling tile (ACT) is a mineral fiber board product that offers many options and advantages. It works well with H.V.A.C. systems; provides easy access to above areas; provides noise reduction properties, and provides light reflectance properties. Some available options include: anti-microbial solutions, fire resistances, a variety of styles, i.e., tegular tiles, scored, flat lay-in, and

textured, and they may come in a selection of colors. The following apply to acoustical tiles:

- Use 2' x 2' size when replacing ceiling systems or in new construction.
- Tiles can be installed directly onto a finished surface, or suspended from a metal grid.
- Suspension systems can be exposed, semi-exposed, or concealed depending on the desired look, but typically should not be in contrasting colors.
- Suspended acoustical tile systems should not be used in family housing.
- Avoid using acoustical tiles on walls for sound absorption. See Wall Finishes above.
- Water marked or damaged ceiling tiles should be replaced immediately.
- Purchase additional ceiling tile stock to have on hand for replacement.
- Consider replacing existing 24" x 48" tiles with a scored 24" x 48" ceiling tile or 24" x 24" system for corridors or office areas. The scored ceiling tiles give the illusion of a 24" x 24" ceiling grid without the expense of installing a new grid to support 24" x 24" tiles.

#### *Gypsum Board*

Gypsum board ceilings are the norm for most construction. They may have a smooth finish or be textured with a thin layer of plaster for visual interest and to improve acoustical performance. Gypsum board is applied directly to wood or metal frame systems. The boards are usually 4' x 8' and the seams are finished off with a tape and float process. Surfaces may be painted or finished with a vinyl wall covering.

#### *Plaster Ceilings*

Plaster ceilings are seldom used in new construction but are often encountered in renovation projects. Plaster is applied over a metal lath in a three-coat process, or over a gypsum lath in a two-coat process. Plaster ceilings should be suspended from wood, steel, or concrete systems that allow for flexible finishes that resist cracking. When plaster is applied to lath that is directly attached to structure, chances of cracking are greater.

#### *Reinforced Concrete Ceilings*

Reinforced concrete ceilings look industrial due to the exposure of the structure, ductwork, lighting systems, and sprinkler systems. These exposed areas may be painted neutral or nondescript colors so that they "blend" with the concrete for a uniform appearance. This works well in spaces where there is a great deal of activity at eye level such as dining facilities or retail environments. Other spaces may benefit from an emphasis played on ceilings, and therefore, contrasts in colors and materials should be used.

#### *Metal Ceilings*

Metal ceilings are typically decorative and are installed as ceiling systems. There are several options available including linear metal, reflective surfaces, open plenum, and stamped metal panels. When using pre-manufactured ceiling systems, lighting, air handling, suspension and acoustical properties are usually accommodated within these systems.



*Health and Wellness Center  
Eglin Air Force Base, Florida*



*Iditarod Dining Facility*  
Elmendorf Air Force Base

#### *Window Treatments*

#### *Miscellaneous*

#### *Wood Ceilings*

Wood ceilings are more commonly used in geographical regions where wood is plentiful. Wood can be used to give a rustic lodge look, or a beautiful plankled ceiling look. Options for wood ceilings include paneling, siding, and wood planks. The underside of a wood plank floor system can also be used as the finished ceiling below. Wood ceilings must have flame spread index ratings of 25 or less. Wood has an excellent insulating value that is helpful in cold climates.

Window treatments have thermal impacts as well as decorative impacts on spaces. When considering solar protection, there are many options: vertical or horizontal blinds, shades, and drapery. All window treatments, including lining materials, must be fire rated. Window coverings for all sleeping areas in lodging should have separate soft-suede blackout linings to block out sunlight. This will accommodate shift workers and transient guests that will sleep during the day. Colors and patterns of window treatments are to be coordinated with interior color schemes. See NFPA 101, 6-6 for fire safety considerations.

#### *Hardware*

Hardware should be chrome brushed aluminum, anodized bronze or antique brass for ease in maintenance. Polished brass surfaces require frequent maintenance. Nonconforming hardware should be replaced during renovations or as the budget allows. The colors and tone of electrical switch plates, electronic devices, and light switches should “blend” with the adjacent surface, i.e., light colors on light, dark colors on dark.

#### *Wiring, Etc.*

Special attention should be taken to conceal all conduit, pipes, electrical wires, communication and computer cables. Where these items cannot be concealed, they should be painted to match wall surfaces or ceiling colors.

#### *Fire Extinguishers*

Fire extinguishers should be placed in metal cabinets that are flush or partially recessed into walls and are clearly identified with the words “fire extinguisher.” Fire extinguishers hanging on walls from hooks are not acceptable. Signs for fire extinguishers or fire notices/exits, etc. and alarm fixtures themselves do not have to be in the color red.

#### **FURNITURE**

Specifications in this chapter provide the minimum standards for furniture purchased by the Air Force. The Air Force utilizes several types of furniture; residential; lodging; food service; office/administration; maintenance/warehouse; recreation; medical; educational; religious, and squadron operations. Furniture should be purchased for its functionality, durability, and aesthetic features. See NFPA 101, 6-6.



## *Furniture and Textile Construction*

Furniture construction can be separated into two categories: wood and metal.

### *Wood*

Wood furniture is either made of softwoods which are evergreens, or hardwoods which are deciduous. Softwoods are used for residential grade furniture and are not recommended for the majority of AF facilities.

Hardwoods are used to construct seating frames, base cabinetry, and solid furniture. Hardwoods make good surface finishes.

Veneers are thin sheets of wood that are glued to base materials, then stained and finished. Premium pieces should be veneered on both sides of each board for stability. These pieces can be very decorative depending on the placement of veneers.

### *Metal*

Metals are used a great deal for office furniture. These metals include steel, aluminum, and alloys. Steel is strong but will rust if not properly treated with a plating or painting process. Stainless steel is very expensive and used only in areas where high durability is required. Aluminum is not as strong but does not rust. The finishes on metal furniture should not chip which will almost always lead to rust and corrosion.

Metal is measured by the gauge – the smaller the gauge the thicker the sheet. For example, an 8 gauge sheet is much thicker than a 16 gauge sheet. The connections of metal furniture are either welded or bolted.

### *Textiles*

When selecting fabrics, there are several factors to consider: color, durability, price, fire resistance, and fiber type. There are natural fibers and artificial fibers. The most common natural fibers for textiles are wool, mohair, cotton, silk and linen. The most common synthetics are polyester, acrylics, nylons, polyurethane, polyvinyl chloride, olefin, and rayon.

There are several treatments that can enhance the performance of textiles. Antibacterial and mildew resistance treatments protect against the growth of mold and mildew. Anti-static treatments aid in reducing static electricity. Fireproofing, fire-retardant, and flame resistance treatments help fabric to resist ignition, slow flame spread, and provide fireproofing. Scotchguard, Soil-repellant Zelan and Zepel are soil, stain and water resistant treatments.

### *Conventional Furniture*

Conventional furniture is the arrangement of free-standing furniture including, but not limited to: administration furniture, dormitory furniture, lobby furniture, dining furniture, etc. Conventional furniture is usually acquired on a DD 1348-6 through Air Force base supply.

### *Seating*

#### *Operational Seating*

The awareness of ergonomics is important when choosing task chairs. Five prong base chairs with casters are suggested to provide excellent stability and mobility. Casters should be composed of a dual hard wheel for use on carpet,



*Air Force Senior Noncommissioned  
Officer Academy*  
Gunter Annex, Maxwell Air Force Base,  
Alabama

and single soft wheel for use on hard flooring surfaces. Chair arms should be replaceable or removable in the field. Molded plastic arms, used for most applications, are easier to maintain; upholstered arms tend to soil easily with high use. Adjustable arms are required for intensive use by computer operators. Chair frames should be finished in chrome or a powder coated epoxy. Wood based chairs are more expensive and may be chosen for executive use.

#### *Stationary Chairs*

Stationary chairs with four posted legs are suggested. These chairs are not often moved since they are used as office side chairs or perimeter seating in conference rooms.

Sled based chairs offer sliding motions when scooting in and out from under tables and desks. Provide appropriate chair glides for either carpet or hard floor surfaces. Clear glides are preferred on hard floor surfaces since black glides tend to leave marks.

Seating used in dining facilities and cafeterias should have “wipe-out channels” or chair backs that are spaced from their seats for ease of cleaning.

#### *Lounge Seating*

Lounge seating is defined as fully upholstered seating for lobbies, waiting areas, lounge areas, and private executive offices.

All internal frame parts should be kiln-dried hardwoods. All exposed parts should be cut from #1 common or better grade hardwood with uniform grain and color uniformity.

Frame joints should be carefully fitted and secured with dowels. Frames must be reinforced with corner blocks mitered to fit securely.

Each seat foundation is to be 8-1/2 gauge sinuous wire springs clinched to insulated tie wires and strapped to tie rails and back post. Back construction is 11 gauge wire spring construction stretched between top and bottom spring rails and secured with double staples. The spring system should be covered with noise free insulating fabric and stapled to the frame on all sides.

Seats are to be cushioned with 1.80 lbs. density polyurethane foam with 32 lbs. of construction. Each seat cushion is wrapped with resin treated polyester fiber to give a smooth even finish. Chair backs and cushions should be 1.10 lbs. density polyurethane foam with 20 lbs. for back compression and 35 lbs. for arm compression. Backs and arms should be topped with blended fiber battings for smooth even appearances. All units should be constructed to allow for field reupholstering and repair.

Upholstery patterns should be marked on the vertical and horizontal for a uniform pattern. Upholstery should be treated with soil retardants.



Waiting area seating for medical facilities should accommodate children, pregnant women, the elderly, heavy or tall people, and the physically weak. All seating should have arms for ease in and out of seated positions. Chair seats shall be firm, level with the floor, and not at a decline toward the backs of the chairs.

#### *Children's Furniture*

Children's furniture should be very durable and scaled down to child size. Most manufactures with children's lines will offer scaled down furniture primarily for preschoolers and first graders, and junior sized furniture for children eight to twelve years of age. Once a child reaches age seven or eight, they will prefer to sit in "grown up" furniture when given a choice.

#### *Tables and Countertops*



*Child Development Center*  
United States Air Force Academy,  
Colorado

The undersides of table tops may not be less than 28 inches from floors, while table tops, for sitting applications, are not to exceed 30 inches from floors. The height of tables for standing applications is not to exceed 36 inches from the floor.

Each table top should be constructed of one piece unless the table length is too long to fit in a doorway and, therefore, must be shipped in two or more pieces. Core materials must meet or exceed strength requirements for commercial standards. Particle board must have a minimum density of 48 lbs. per cubic feet. Cores must be sanded from top to bottom leaving smooth edges. Laminates or veneers must be glued uniformly and evenly to ensure adhesion and stability. Applied edging must be mitered, and all wood edges must be hardwood. Laminate tops are to be used with vinyl edging, self-edging, or solid wood edging. Wood veneer tops are appropriate for conference rooms and executive areas.

All bases must be appropriately sized to their tops and be equipped with leveling glides. All metal bases should be finished in powder coatings.

Consider the size of tables for each application. A good rule of thumb for dining tables and conference tables is to allow 24" to 30" of edge space per person. When selecting end tables, always consider the height of adjacent objects so that they are complemented by end table.

Several small tables may be used to form one large table or various table formations for flexibility. High quality folding tables may be used in dining rooms to allow changes in table layout. When table legs are desired (in place of table bases), it is important to make sure legs do not interfere with users.

Table manufacturers are meeting the needs of providing more "functional" tables. For example, there are several styles of tables that can be purchased with casters for mobility. Tables that fold, dismantle, or that can be raised or lowered, are popular when flexibility is essential. As telecommunication and data communication technology advances, tables are introduced with new options for power and communications cabling.

### *Freestanding Office Furniture – Casegoods*

Freestanding office furniture includes desks, credenzas, computer tables, executive “u” units, and bookcases.

Metal casegoods with laminate work surfaces should meet the standards and construction of systems furniture, yet, they are floor supported (free standing). Wood veneers should be edged with hardwoods, and all units should have glides for leveling.

Desk tops should be equipped with two grommets (two inches minimum in diameter) to allow for electrical cords. Location of grommets will vary depending on application. Work surface tops with rolled/soft edges are preferred to a straight edge for comfort. Drawers must use full extension, stop action progressive slides with precision ball bearing, and no metal to metal connection for a smooth, quiet operation. Dovetail construction should be used on all corners. All drawers should be able to receive dividers and accommodate other filing options needed. Drawers should also be lockable and keyed alike, within each workstation, with removable cylinders for re-keying.

### *Filing Cabinets*



*Air Mobility Command Design Center  
Scott Air Force Base, Illinois*

Metal filing cabinets should be manufactured with rolled metal that is seamless on three sides and rounded at the corners for a smooth finish. When wood file cabinets are appropriate, use veneer surfaces and hardwood edges. An interlock system is required on drawers so that only one drawer will extend at one time. Drawers should have ball-bearing suspension systems with anti-rebound devices, and drawer pulls should be recessed so they do not get knocked off or get in the way of traffic.

All lateral files should have front-to-back and side-to-side filing options. Cabinets should be flexible to allow for fixed shelves on five high units, or roll-out shelves and drawers. All units should be equipped with glides of leveling devices to ensure drawers or doors open properly. Color should be electrostatically applied at the factory.

### *Temporary Living Facilities and Dormitories – Casegoods*

Furniture for these spaces include: headboards, bed frames, night stands, wardrobes, units with drawers or open shelves, TV armoires, desks, writing tables, dressers, chests, mirrors, end tables, coffee tables, various types of seating/hide-a-beds, dining tables, computer accessibility, etc.

All furniture should be constructed of solid wood veneers, hardwood solids, or five-ply lumber-core with wood veneers. The suggested wood for all solid parts and veneers should be northern red oak or equal durable hardwood. The finished product can be treated and stained for the desired look. Particle board and cardboard are not acceptable. Back pieces must be equal to the sides in thickness, or a minimum of 1/4” inch thick.

Drawer fronts, doors, desk tops, and other components should be removable and replaceable on site. This extends the life of a product by changing individual damaged parts rather than ordering an entire new unit.



*Family Housing Phase I*  
Vandenberg Air Force Base, California

#### *Systems Furniture*



*Building 32 Rehabilitation*  
Wright-Patterson Air Force Base, Ohio

The dry construction method, with metal-to-metal connections, is the preferred method of construction. This method creates a stronger, more durable casegood; glue joints tend to fail. Screws, hinges, etc., should be concealed or inserted into the lumber for a clean, high quality look. Units held together only with glue and staples are unacceptable.


Dove-tail joinery should be used as drawer joints. Drawer pulls should be flush or recessed for furniture that is highly used. This prevents the pulls from being knocked off, or pulled off. Drawer bottoms should sit in grooves and the drawer sides should be reinforced. Epoxy coated metal drawer slides with nylon bearing rollers with automatic stop feature are suggested. TV armoires and shelving units should have grommet holes in the backs in which to run electrical and telephone cords. All large units should come with leveling glides.

Systems furniture, also known as furniture systems, modular furniture, and ADP furniture, is distinguished from conventional furniture by its modularity. Systems furniture is a combination of various sized panels that support individual components to create work areas and workstations. Components, such as work surfaces, shelving, storage units, lighting, tackboards, paper organizers, and other accessories, are assembled to create a custom work space. The work space may be conventionally wired or wired through systems panels. Systems furniture may have solid panels, stacking panels, or floor supported components without panels.

Open office plans are ideal spaces for systems furniture. The open office plan is the elimination of interior hard walls while maintaining essential divisions. Semi-private spaces are developed through the use of partial height panels arranged to facilitate work flow and functional tasks. To accommodate the dual needs of privacy and communication, work areas should provide visual privacy while allowing for personal interaction.

Private work areas surrounding common group areas should be provided for team settings and personnel with complex tasks. Place panels to separate adjacent work areas only where necessary to avoid excessively compartmentalized mazes. It is not cost effective to purchase panels for placement against existing walls that already provide privacy such as private offices. When designing open office plans, keep in mind support areas such as copier space, storage space, coffee bars, break areas, and coat storage.

A “standard” for systems furniture should be adopted so that there is uniformity throughout each facility. It is recommended to choose one product line from a single manufacturer as well as standard finishes for systems furniture. A hierarchy of spaces should be designed that range from clerical/secretarial levels up to supervisory levels. Workstation sizes, layouts, components, and privacy are determined for each level of hierarchy and should be standardized throughout an entire facility. Panel heights may vary according



to hierarchy and add interest to spaces. Tall panels of approximately 60" high are good for spaces requiring visual privacy and acoustical support when occupants are at seated positions. Lower panels of approximately 42" high may be used for secretarial stations to allow for direct communication by supervisors and personnel. This panel height is suggested for placement at windows, utility vents, and fire pulls.

Most office systems furniture layouts rely heavily or exclusively on square component shapes and orthogonal space layouts. The introduction of curved panels, panels placed at different angles, and panel windows provide physical and visual relief, helping to break-up the "boxy" maze of repetitive spaces. Locations appropriate for these treatments include corner panels at beginnings and ends of series of panels, at intersections of circulation aisles, and at workstations that are visible from reception areas. Glazed, fire-rated panels offer privacy without confinement and should be integrated into overall interior landscapes. Acrylic window panels are unacceptable as they exceed flame and smoke development requirements.

Acoustical performance ratings should be based upon workstation designs. While the sound transmission class (STC) and noise reduction coefficient (NRC) ratings contribute to overall acoustical performance, the acoustical role of panels is relatively minimal in the overall environment when compared to sound absorptive properties of other finish surfaces such as carpet and acoustical ceiling tiles. In addition, panel hung components greatly reduce the quantity of acoustical contributing area.

Systems furniture is usually acquired on an AF Form 9 and procured directly through the base contracting office. Base Supply is by-passed. The installation is typically provided by the systems furniture contractor. The CE interior designer will either design the package or contact a contractor. Systems furniture projects shall be reviewed/approved by the CE interior designer, the MAJCOM interior design office, fire marshal and Base Safety Offices.

#### *Pre-wired Workstations*

The term "pre-wired workstation" is now obsolete. Pre-wired workstations were funded with Military Construction funds (3300 funds) and provided by the building contractor. Systems furniture may still be provided by the construction contractor; however, it is now funded with O&M 3400 funds. An overall review of the electrical system should be performed by a qualified electrical engineer prior to the purchase of the systems furniture to ensure the building can support the new furniture's wiring.

#### *Miscellaneous*

##### *Artwork*

Artwork should be used to enhance all areas including: lobbies; waiting rooms; general office areas; corridors; conference rooms; break rooms; restaurant and cafeterias; lodging, and recreational areas.



Create themes for artwork throughout facilities and follow established standards for matting, framing and displaying. Facilities with multiple floors can have varied themes from floor to floor as long as there are smooth transitions between each theme. Avoid suggestive or controversial subjects when choosing artwork. All hanging artwork must be attached to walls so that each piece is straight and aligned. Consider using security locks on artwork that could easily be pilfered.

#### *Plants*

Plants bring nature into interior spaces. They also have an impact on good health and the environment. Choose live plants whenever possible. If artificial plants are the only alternative, they should be flame retardant rated.

#### *Bulletin Boards and Tackboards*

Bulletin boards and tackboards should be provided in common areas to display notices and announcements. These boards should coordinate with signs and other adjacent building finishes. Avoid taping literature to walls, doors or windows. This is unprofessional and tape creates a tacky film that may harm surfaces.

#### *Warranties*

An important feature to consider when purchasing furniture is the warranty. Research how each manufacturer handles their warranties and response time. To maintain furniture, it is important to abide by the terms of each warranty. When furniture is altered without manufacturers' guidance or assistance, warranties become void.

### *Entries and Lobbies*

#### FUNCTIONAL AREAS

Entries and lobbies should be designed with highly durable finishes while introducing facilities with themes and pleasant, welcoming environments.

Building entries and lobbies provide transitions from the exterior to the interior. First impressions are created in these spaces when a person enters the building. Consequently, the highest quality materials should be used in these spaces whenever possible. Nonskid paver tiles or ceramic tiles in neutral colors are wise choices as floor surfaces and wall bases. These are durable and easy to maintain in high traffic areas, and they hold up to exposure from outside elements. Consider using tile as wainscot up to 36" on walls to protect wall surfaces. Provide recessed walk-off mats or stiff bristle-type mats in all entry areas where carpet is not present. This is especially important in an entry without a vestibule.

Extending exterior finishes into lobbies creates natural transitions provided the materials are aesthetically pleasing for interior concepts. For example, brick can be extended into a lobby, and with an interesting pattern or changes in texture and relief, a dynamic focal point can be created. Live foliage is also suggested to further give smooth transitions from the outdoors to interior spaces.



### *Corridors*



*Nellis Federal Hospital  
Nellis Air Force Base, Nevada*

Consider soft textures against hard surfaces for contrast and interest. When seating is required, use carpet islands inserted into tile to define seating areas. Artwork will add to the decor to emphasize the concept of the space. Light fixtures, when strategically placed, can provide patterns, textures and interesting shadows. Light levels may be low and either incandescent or indirect in lobbies; however, lighting should be used to accentuate areas such as information desks, elevator doors, directories and artwork. Directories and signs are important in the absence of reception areas. The fire alarm panels should be discreet while easily accessible in emergencies.

Second to lobbies, corridors are the most public spaces of building interiors and, as such, should convey strong visual statements. Corridors receive more wear than interior rooms; therefore, they require extra care when selecting finish materials. Interesting corridors can be designed with floor patterns, wall textures, accent lighting for artwork, wall washing, and wall sconces. Utility corridors should be given attention as well. See NFPA 101, 6-5.

When faced with long “tunnel like” corridors, emphasize vertical elements for balance. Install carpet “islands” with borders running perpendicular to walls will shorten long corridors. If carpet islands or borders are used, the center area should be either darker than the borders or “busier” than the borders, i.e., patterned designs. Integrating 12” x 48” lighting fixtures, installed perpendicular to the corridor walls, will also visually shorten long corridors. Avoid accentuating horizontal elements. The combination of chair rails, carpet borders, and lighting that runs parallel to the corridors, greatly increases the visual length of corridors.

When corridors are narrow, consider wall washers for light fixtures to visually push the wall outward. Also, darker floor colors compared to that of walls “widen” corridors.


Interior finishes in the corridors should coordinate with other finishes within each facility. Way finding with carpet, wall coverings, or borders, are good solutions in some facilities. If carpet is not a good option, patterns and borders can be created using VCT, sheet vinyl, or ceramic tiles at little additional cost, if any.

### *Stairwells and Landings*

Significant stairwells and landings, with high public visibility such as those that stem from lobby areas, should have finish materials that complement adjacent areas. Stairwells can be used as transition spaces that tie all floors together for coordinated overall design. Utility stairwells and fire exits need durable finishes that are easy to maintain. Stairs in dormitories must be able to withstand frequent moves in and out of facilities. See NFPA 101, 6-5 for fire safety considerations.

### *Restrooms*

Restrooms should be designed with materials that can be easily cleaned and maintained. Restroom fixtures should be wall-mounted to ease the cleaning of the floors. Accessories should include paper towel dispensers, mirrors, soap



dispensers, clothes hooks on toilet partitions and in shower areas, and trash receptacles. Paper towel dispenser should be adjacent to lavatories for convenience and the avoidance of wet hands dripping water onto floors. Lavatories should be integrated with counters while free-standing, decorative sinks have separate vanity areas close by. Avoid small medicine cabinet style mirrors. Choose one color for entire toilet fixture, i.e., white seats on white toilets.

Ceilings in all bathrooms and locker areas need to be water resistant. Flooring should be monolithic tile, while walls can be either monolithic tile or glazed tile. It is recommended that tile be used on all walls behind wet areas such as sinks, toilets, urinals and showers. Lighting should be bright for good grooming and cleaning.

#### *Locker Rooms*

Locker rooms are to be well ventilated and designed with materials that are easily cleaned. An adequate number of lockers should be installed with vents, shelves and clothes hooks. Space between the top of the lockers and ceilings shall be finished and flush with locker fronts to avoid dust collection. Lockers should be finished in factory baked enamel or be electrostatically painted.

#### *Conference Rooms*

Conference rooms range from formal to casual, large to small, depending on the functions that will take place in these rooms. Flexibility can be maximized with the use of adjustable lighting, multipurpose seating, creative ceiling finishes, acoustical and/or tackable wall treatments, and multi-media presentation systems. Carefully plan the location of electrical outlets and consider flush mounted floor outlets for audiovisual equipment and computers. Chairs around conference tables should have casters for easy mobility. Stationary chairs may be placed along walls.

#### *Control Centers and Computer Rooms*

Access flooring systems are ideal for control centers and computer rooms for easy access to cables and wiring. Floor tiles should be finished with static dissipate vinyl tile, conductive vinyl tile, or low KV (<2.5) static rated carpet tiles. Furniture systems can be configured to accommodate various types and sizes of equipment. Quality ergonomic seating should be required for all office personnel who frequently work at computer terminals.

#### *Break Areas/Coffee Bars*

Break areas and coffee bars require material finishes that can be easily cleaned and maintained. A counter area with a sink and storage for coffee, snacks, utensils, etc. is recommended. Larger areas may include a designated space and electrical outlets for refrigerators and microwaves. Rooms used for eating and drinking should have ceramic tile, VCT or seamless resilient vinyl sheet floors for ease in clean-up.

#### *Copy and Fax Areas*

Hard, acoustical surface flooring, such as linoleum, is recommended for these areas. Toner staining is difficult to remove from carpet; however, acoustical properties are needed to absorb noise created by copy and fax machines. Consider acoustical wall finishes to damper noise.



*Air Force Senior Noncommissioned  
Officer Academy*  
Gunter Annex, Maxwell Air Force Base,  
Alabama

#### FINISHES FOR FUNCTIONAL GROUPS

The main factors affecting finish material selections and applications include: foot traffic; presence of food; liquids; chemicals; grease or other potential soilage; activity type, and the level of quality required. Facilities with similar function types are grouped together in the *Reference Charts* listed on the following pages. Each chart lists material selections appropriate for each “use” category (heavy use, medium use, and light use). Specialized areas are also addressed to provide general design requirements.

Some facilities fit into several functional groups, and therefore, designers must coordinate finish materials from each applicable *Reference Chart*. For example, a building with administrative offices, training facilities, and a large cafeteria, will require specific finishes from the “*office/administrative*” group, the “*educational*” group, and the “*food service*” group.

*Office/Administrative Facilities*

Office/administrative areas often have the highest number of occupants. These areas vary from private offices to open work spaces filled with conventional furniture to large arrangements of systems furniture. Consider all areas carefully when selecting finish materials. Care should be taken to coordinate and conceal electrical, telecommunications and data communication cables. Conference and meeting rooms should be carpeted to help with acoustic controls. *Reference Chart 1* lists the types of materials that are most suitable from heavy to light use conditions.

## REFERENCE CHART 1

## Office/Administrative Interior Design Materials Selection Chart (Heavy-Use)

Materials	<b>Heavy-Use</b> entrances, foyers, lobbies, main circulation corridors, stairwells, elevators, restrooms, large conference or meeting rooms, snack bars, coffee areas, loading dock, and media production areas  OFFICE / ADMINISTRATIVE
Floor	carpet (loop) ceramic tile quarry tile vinyl composition tile
Base	ceramic tile quarry tile rubber base wood
Walls	ceramic tile paint vinyl wall covering masonry (if carried in from the exterior)
Chair Rail	molded plastic wood
Ceiling	acoustical tile gypsum board specials
Lighting	fluorescent incandescent specials
Window Covering	vertical blinds horizontal blinds lined draperies
Upholstery	fabric (50,000+ DR) vinyl

## REFERENCE CHART 1 (CONTINUED)

## Office/Administrative Interior Design Materials Selection Chart (Medium-Use)

**Materials**                      **Medium-Use**  
internal circulation, staff office areas, and  
small conference rooms

**OFFICE / ADMINISTRATIVE**


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**Floor**                              carpet (loop)

---

**Base**                                wood  
rubber base

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**Walls**                              paint  
vinyl wall covering  
fabric wall covering (heavy duty)  
masonry (if carried in from the exterior)

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**Chair Rail**                        molded plastic  
wood

---

**Ceiling**                            acoustical tile

---

**Lighting**                         fluorescent  
incandescent  
specials

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**Window Covering**            vertical blinds  
horizontal blinds  
lined draperies

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**Upholstery**                      fabric (25,000+ DR)

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## REFERENCE CHART 1 (CONTINUED)

## Office/Administrative Interior Design Materials Selection Chart (Light-Use)

Materials	Light-Use commander's suite and private office areas
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## OFFICE / ADMINISTRATIVE

Floor	carpet (loop, cut & loop, cut)
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Base	wood rubber base
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Walls	paint vinyl wall covering fabric wall covering masonry (if carried in from the exterior) wood (wainscot)
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Chair Rail	wood
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Ceiling	gypsum board acoustical tile
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Lighting	fluorescent (indirect, selected direct) incandescent specials
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Window Covering	vertical blinds horizontal blinds lined draperies
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Upholstery	fabric (25,000+ DR) leather
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### Training/Educational Facilities



*Child Development Center*  
Hanscom Air Force Base, Massachusetts



*Air Force Senior Noncommissioned  
Officer Academy*  
Gunter Annex, Maxwell Air Force Base,  
Alabama

Education facilities include grade schools, high schools, specialized training facilities, professional and technical classrooms, and centers for college extension programs. *Reference Chart 2* lists the types of materials that are most suitable from heavy to light use conditions.

#### REFERENCE CHART 2

##### Educational Interior Design Materials Selection Chart (Heavy-Use)

#### Materials

#### Heavy-Use

entrances, foyers, snack bars and cafeteria service areas, restrooms, fitness areas, simulator rooms, and technical classrooms.

#### EDUCATIONAL

#### Floor

carpet (loop); child development center play areas:  
use cut pile to avoid "carpet burn"  
vinyl composition tile/sheet vinyl  
ceramic tile  
quarry tile

#### Base

ceramic tile  
quarry tile  
rubber base  
covered sheet vinyl

#### Walls

paint  
ceramic tile  
vinyl wall covering (type II)

#### Chair Rail

molded plastic

#### Ceiling

gypsum board  
acoustical tile

#### Lighting

fluorescent  
High-intensity discharge (HID)

#### Window Covering

horizontal blinds  
vertical blinds

#### Upholstery

vinyl  
molded plastic

REFERENCE CHART 2 (CONTINUED)  
Educational Interior Design Materials Selection Chart (Medium-Use)

Materials	<p>Medium-Use administrative offices, conference and briefing rooms, classrooms, and corridors</p> <p>EDUCATIONAL</p>
Floor	<p>carpet (loop) vinyl composition tile/sheet vinyl</p>
Base	<p>rubber base covered sheet vinyl</p>
Walls	<p>paint vinyl wall covering (type II) acoustical wall treatment (heavy duty)</p>
Chair Rail	<p>wood molded plastic</p>
Ceiling	<p>gypsum board acoustical tile</p>
Lighting	<p>fluorescent incandescent</p>
Window Covering	<p>horizontal blinds vertical blinds lined draperies</p>
Upholstery	<p>vinyl fabric (25,000+DR) molded plastic wood</p>

REFERENCE CHART 2 (CONTINUED)  
Educational Interior Design Materials Selection Chart (Light-Use)

Materials      Light-Use  
principal's office and commander's suite

EDUCATIONAL

Floor      carpet (loop, cut & loop, cut)

Base      rubber base  
wood

Walls      paint  
vinyl wall covering)  
fabric wall covering

Chair Rail      wood  
molded plastic

Ceiling      gypsum board  
acoustical tile

Lighting      fluorescent  
incandescent

Window Covering      horizontal blinds  
vertical blinds  
lined draperies

Upholstery      vinyl  
fabric (25,000+DR)  
molded plastic  
wood  
leather

## Maintenance and Warehouse Facilities

Maintenance and warehouse facilities include all functional areas in which vehicles or heavy equipment are operated, chemicals are used, exposure to weather occurs, product dust and dirt are present, and bulk items are stored. Most areas within these facilities fall under the heavy-use heading. *Reference Chart 3* lists the types of materials that are most suitable from heavy to light use conditions.

### REFERENCE CHART 3

#### Maintenance/Warehouse Interior Design Materials Selection Chart (Heavy-Use)

Materials	<p><b>Medium-Use</b> administrative areas located separately from the heavy-duty areas</p> <p><b>MAINTENANCE/WAREHOUSE</b></p>
Floor	<p>concrete (sealed) ceramic tile quarry tile</p>
Base	<p>ceramic tile quarry tile rubber base</p>
Walls	<p>paint masonry (if carried in from the exterior)</p>
Chair Rail	<p>none</p>
Ceiling	<p>exposed gypsum board (water resistant)</p>
Lighting	<p>fluorescent High-intensity discharge (HID) specials</p>
Window Covering	<p>horizontal blinds</p>
Upholstery	<p>vinyl</p>

## REFERENCE CHART 3 (CONTINUED)

## Maintenance/Warehouse Interior Design Materials Selection Chart (Medium-Use)

**Materials**                      **Medium-Use**  
administrative areas located separately from the  
heavy-duty areas

**MAINTENANCE/WAREHOUSE**

**Floor**                              carpet (loop)  
vinyl composition tile

**Base**                                rubber base

**Walls**                              paint  
masonry (if carried in from the exterior)  
vinyl wall covering type II

**Chair Rail**                        molded plastic

**Ceiling**                            acoustical tile

**Lighting**                         fluorescent

**Window Covering**           horizontal blinds  
vertical blinds

**Upholstery**                      fabric (50,000+DR)  
vinyl

## REFERENCE CHART 3 (CONTINUED)

## Maintenance/Warehouse Interior Design Materials Selection Chart (Light-Use)

Materials                      Medium-Use  
commander's suite if separate from high-use areas

## MAINTENANCE/WAREHOUSE

Floor                              carpet (loop, cut & loop, cut)

Base                                wood  
rubber base

Walls                              paint  
masonry (if carried in from the exterior)  
vinyl wall covering type II  
fabric wall covering

Chair Rail                        wood

Ceiling                            acoustical tile  
gypsum board

Lighting                         incandescent  
fluorescent

Window Covering              horizontal blinds  
vertical blinds  
lined draperies

Upholstery                       fabric (25,000+DR)  
leather

### Food Service



*Kenai Dining Facility*  
Elmendorf Air Force Base, Alaska



*Iditarod Dining Facility*  
Elmendorf Air Force Base

Food service facilities include dining halls, flight kitchens, open mess facilities – officer and enlisted clubs, snack bars, and cafeterias. Most areas in these facilities can be considered heavy-use because they are subject to high traffic and frequent food and beverage spills. Carpet is required in the seating areas of dining halls and open messes, and is desirable in other dining areas such as golf course restaurants and large cafeterias in administrative areas. Some food service facilities may incorporate woods, metals, or other structural materials used for decorative affects. Structural and mechanical elements may be exposed if intended by the overall design scheme. Consideration should be taken to provide dedicated areas for shared use of microwaves, refrigerators, and counters with the appropriate amount of space as well as an efficient number electrical outlets. Materials with good acoustical properties should be used to baffle noise from kitchens and dishwashing rooms. Provide menu boards that coordinate with room finishes and are easily changeable in the field. *Reference Chart 4* lists the types of materials that are most suitable from heavy to medium use conditions.

#### REFERENCE CHART 4

#### Food Service Area Interior Design Materials Selection Chart (Heavy-Use)

Materials	Heavy-Use high traffic areas, lobby, wet areas, restrooms, corridors, and serving lines
FOOD SERVICE	
Floor	ceramic tile quarry tile vinyl composition tile
Base	ceramic tile quarry tile rubber base
Walls	ceramic tile paint vinyl wall covering type II or type III masonry (if carried in from the exterior)
Chair Rail	molded plastic plastic laminate wood
Ceiling	gypsum board (water resistant) specials
Lighting	fluorescent incandescent specials

CHART 4 CONTINUES ON NEXT PAGE

Window Covering	vertical blinds horizontal blinds
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Upholstery	fabric (50,000+ DR) vinyl
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#### REFERENCE CHART 4 (CONTINUED)

#### Food Service Area Interior Design Materials Selection Chart (Medium-Use)

Materials	Medium-Use dining areas, management and administrative areas
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#### FOOD SERVICE

Floor	carpet in admin areas (loop pile) carpet in dining rooms (cut pile) vinyl composition tile
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Base	rubber base
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Walls	paint vinyl wall covering type II masonry (if carried in from the exterior)
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Chair Rail	wood, plastic laminate, molded plastic
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Ceiling	fluorescent gypsum board specials
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Lighting	fluorescent incandescent
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Window Covering	vertical blinds horizontal blinds
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Upholstery	fabric (25,000+ DR)
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## Dormitories and Family Housing



*Cadet Dormitory Furniture*  
United States Air Force Academy,  
Colorado

The residential category is composed of Military Family Housing (MFH) and Unaccompanied Personnel Housing (UPH), also known as dormitories. *Reference Chart 5* lists the types of materials that are most suitable for heavy use to medium use conditions. Refer to the *Air Force Dormitory Design Guide* for more details.

REFERENCE CHART 5  
Residential Design Materials Selection Chart (Heavy-Use)

Materials	High-Use high traffic areas, entrance foyers, kitchens, bathrooms, stairwells, laundry, vending areas, corridors, hallways,	
	DORMITORIES	FAMILY HOUSING
Hard Surface Floor	ceramic tile quarry tile vinyl composition tile	ceramic tile sheet vinyl wood
Carpet	loop pile	cut pile
Base	ceramic tile quarry tile rubber base	ceramic tile wood rubber base
Walls	ceramic tile paint plastic laminate	paint vinyl wall covering type I
Chair Rail	molded plastic plastic laminate wood	wood
Ceiling	acoustical tile gypsum board	gypsum board
Lighting	incandescent fluorescent	incandescent fluorescent (kitchens)
Window Covering	vertical blinds lined draperies	shades lined draperies horizontal blinds
Upholstery	vinyl fabric (50,000+ DR)	N/A

REFERENCE CHART 5 (CONTINUED)  
Residential Design Materials Selection Chart (Medium-Use)

Materials	Medium-Use dayroom, family room, dining room, TV room, offices, sleeping rooms	
	DORMITORIES	FAMILY HOUSING
Floors	carpet (cut or cut & loop)	wood carpet (cut or cut & loop)
Base	wood rubber base	wood rubber base
Walls	vinyl wall covering (type II) paint	paint vinyl wall covering wall paper
Chair Rail	wood	wood
Ceiling	acoustical tile gypsum board	gypsum board
Lighting	fluorescent incandescent	fluorescent (kitchens) incandescent
Window Covering	vertical blinds lined draperies	shades lined draperies horizontal blinds vertical blinds sheer draperies
Upholstery	vinyl fabric (25,000+ DR)	N/A

*Chapel*

Chapel facilities include all spaces for worship. These include community worship, individual meditation, pastoral counseling, and religious education. These sacred areas receive a great deal of traffic and are considered in the high use category, yet should convey warmth and beauty through the use of wood finishes and furnishings. *Reference Chart 6* lists the types of materials that are most suitable from heavy to light use conditions.

REFERENCE CHART 6  
Residential Design Materials Selection Chart (Heavy-Use)

Materials	Heavy-Use worship area, sanctuary, narthex, choir room, cry room, blessed sacrament and reconciliation room, entrance foyer, kitchen, cafeteria/assembly room, activities center, restrooms
RELIGIOUS ACTIVITIES	
Floor	carpet (loop, cut, cut & loop) vinyl composition tile ceramic tile quarry tile
Base	ceramic tile quarry tile rubber base wood
Walls	paint ceramic tile vinyl wall covering (type II)
Chair Rail	molded plastic wood
Ceiling	gypsum board acoustical tile (avoid suspended in religious services spaces)
Lighting	fluorescent High-intensity discharge (HID)
Window Covering	horizontal blinds vertical blinds
Upholstery	fabric (50,000+DR) vinyl molded plastic wood

## REFERENCE CHART 6 (CONTINUED)

## Religious Activities Interior Design Materials Selection Chart (Medium-Use)

Materials	<p>Medium-Use administrative offices, conference and briefing rooms, classrooms, and corridors</p> <p>RELIGIOUS ACTIVITIES</p>
Floor	<p>carpet (loop or cut &amp; loop) vinyl composition tile/sheet vinyl</p>
Base	<p>rubber base</p>
Walls	<p>paint acoustical wall treatment vinyl wall covering (type II)</p>
Chair Rail	<p>molded plastic wood</p>
Ceiling	<p>acoustical tile (avoid suspended in religious services spaces)</p>
Lighting	<p>fluorescent incandescent</p>
Window Covering	<p>horizontal blinds vertical blinds lined draperies</p>
Upholstery	<p>fabric (25,000+DR) vinyl molded plastic wood</p>

## REFERENCE CHART 6 (CONTINUED)

## Religious Activities Interior Design Materials Selection Chart (Light-Use)

Materials      Light-Use  
chaplain's office and commander's suite

## RELIGIOUS ACTIVITIES

Floor      carpet (loop, cut & loop, cut)

Base      rubber base  
wood

Walls      paint  
fabric wall covering  
vinyl wall covering

Chair Rail      wood

Ceiling      gypsum board  
acoustical tile

Lighting      fluorescent  
incandescent

Window Covering      horizontal blinds  
vertical blinds  
lined draperies

Upholstery      fabric (25,000+DR)  
wood

### *Lodging*

Transient lodging facilities consist of visiting personnel quarters (VOQ's, VAQ's) and Temporary Lodging Facilities (TLF's). VOQ's and VAQ's are equivalent to mid-priced hotels and maintain very high occupancy rates. These facilities require heavy-use quality materials and furnishing that conform to established Air Force Standards. TLF's are small efficiency apartments used by families arriving and leaving the base, and receive heavy use, year around. These facilities reflect a residential quality in furnishings and materials and require very special attention to durability and maintenance.

### *Recreation*



*Youth Activity Center*  
Andrews Air Force Base, Maryland


Recreation facilities encompass the most diverse functions of all the categories. They include gymnasiums, fitness centers, golf course clubhouses, bowling, youth and community centers, libraries, and theaters. Facilities such as fitness centers have constant traffic throughout the day, while facilities such as theaters have high concentrations for short periods. Golf courses, clubhouses, and bowling centers include food service spaces that required appropriate material selections for these areas. Many of these facilities require a specialized flooring treatment for each activity as well as acoustical wall treatments for sound control.

### **BUILDING CODES**

ADA and Federal Access Codes must be incorporated in all new construction, remodeling and historical renovation projects.

There are also three model building codes that set forth minimum requirements for design and construction in order to protect public health and safety. The Basic Building Code, developed by the Building Officials and Code Administration International (BOCA), is the official code adopted for any standard not already addressed by AF publications. The Southern Building Code, developed by the Southern Building Code Congress International (SBCCI), is used primarily in the south. The Uniform Building Code, developed by the International Conference of Building Officials (ICBO), is used primarily in the western states. Building codes are adopted and enforced by the states, counties, or cities having jurisdiction. Enforcing officials will often modify codes to include a specific topic in their region. Codes are regionalized due to different building conditions in each region. For example, northern states incur heavy snow loads, western states experience earthquakes, and southern states endure hurricanes. By the year 2000, it is likely that all three codes will be combined into one code – The International Building Code.

There are four model fire codes that are typically performance based and deal primarily with the preservation of human life, and the contents of buildings. The National Fire Prevention Code (NFC) is sponsored by BOCA. The



Unified Fire Code (UFC) is sponsored by ICBO, and The Standard Fire Prevention Code (SFC) is sponsored by SBCCI. The National Fire Codes (NFC) written by the National Fire Protection Association (NFPA), which includes the NFPA 101 Life Safety Code, is the best known of all fire codes. Most importantly, the National Fire Codes are the only fire codes officially adopted by DOD.

As designers, we must select construction materials and material finishes that are safe for the environments we create. There are several tests that have been developed to determine the safety of products. Usually manufacturers have their products tested, if not, you may request them to do so. There are four major institutions that monitor these tests: American National Standards Institute (ANSI); American Society for Testing and Material (ASTM); National Fire Protection Association, (NFPA), and Underwriters Laboratory (UL).

#### FIRE TESTING

The following are some of the tests performed on material finishes:

##### *The Wyzenbeek Test*

The Wyzenbeek test, or Oscillatory Cylinder Method, tests abrasion resistance of fabric by measuring the number of times a machine rubs a fabric. The number of cycles a fabric can endure is the measurement of the fabric. The fabric is then classified as light duty at 3,000 cycles, medium duty at 9,000 cycles, and heavy duty at 15,000 cycles.

##### *Steiner Tunnel Test – also known as ASTM E84*

The Steiner Tunnel Test is performed on interior finishes for walls and ceilings. This process begins by mounting a 24"x21" wide sample to the ceiling of a tunnel, then igniting it for ten minutes. The *flame-spread index* measures the maximum distance the flame spreads along the length of the sample. Rated materials are compared to Red Oak flooring which rates 100. A Class A rating has a *flame-spread index* of 25 or less. A Class B rating has a *flame-spread index* of 26 – 75, and a Class C rating has a *flame-spread index* of 76-200.

##### *Flooring Radiant Panel Test – ASTM-E-648*

This test involves exposing a floor material to radiant heat and igniting flames. The objective of this test is to measure the resistance of floor coverings to heat and flames to limit the progression of fully developed fires through corridors. The rating is based on Critical Radiant Flux values that measures the distance flooring systems burn to extinguishment.

##### *Methenamine Pill Test – DOC-F-170*

This test measures the reaction of a burning methenamine pill placed on carpet. If the flame spreads, the carpet must be labeled as flammable. This test is required by Federal regulations on all carpet sold, and transported across state borders.



#### *Room Corner Test – UBC-42-2*

This procedure was designed to test textile wall coverings in realistic circumstances involving fires. An 8'x8' room is prepared with the sample wall fabric on three walls, then exposed to a flame source for ten minutes. The rating is pass or fail based on whether flashover occurs.

#### *Cigarette Ignition Resistance Test for Furniture Composites*

This test determines the resistance to ignition of a piece of upholstered furniture. Three lighted cigarettes are placed on a piece of upholstered furniture and are covered with cotton sheeting to intensify heat. If there is flaming combustion or if char develops more than two inches in any direction, the furniture composites fail the test.

#### *Cal Tech 133 – Full Seating Test*

This is the most stringent test of fire resistance for commercial seating. It is required in some jurisdictions for commercial interiors with high-risk occupancies such as auditoriums and health care facilities. A pass or fail rating is given as the test measures the rate of heat release, smoke obscuration, and carbon monoxide.

#### *Vertical Ignition Test*

This tests the flame resistance of fabrics that hang vertically such as window treatments. It is performed either in large or small scale and the results are pass or fail.

#### *Smoke Density Test*

The Smoke Density Test measures the smoke released by a flaming or smoldering material. The smoke density is determined and reported in terms of maximum optical density based on an arbitrary scale of zero to 800. A smoke-density rating of 450 or less is required in most jurisdictions.